CRM Design Note: Availability Obligations and Penalties

13/09/2019

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1 Introduction

1.1 Context and goal of the present design note

The goal of this present note is to further clarify and receive any useful feedback from market parties on the latest CRM design proposal for Availability Obligations and Penalties.

ABOUT THE PUBLIC CONSULTATION

This design note is put for formal public consultation and any remark, comment or suggestion is welcomed. It builds further on the discussions and proposals already made in the different TF CRM meetings gathering all relevant stakeholders and in the follow-up committee, the latter consisting of representatives of the CREG and Elia, under the presidency of the FPS Economy.

This public consultation runs in parallel with a public consultation on other design notes. Reactions to this public consultation can be provided to Elia via the specific submission form on Elia's website no later than **Friday 11 October 2019 at 6 pm**.

Early October also a second set of design notes will be launched by Elia for public consultation.

Note that, in line with their roles and responsibilities and the foreseen governance in the Electricity Law, also the FPS Economy and the CREG will consult on aspects within their competence according to their procedures.

1.2 Scope and structure of the present design notes

LEGAL FRAMEWORK

This design note serves to explain the design concepts proposed for the Belgian CRM concerning Availability Obligations and Penalties aspects. Article 7undecies §8 of the Belgian Electricity Law[1] states the following on this aspect (own translation from the law):

[1] http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&table_name=wet&cn=2019042221

"After consultation of the grid users, the transmission system operator submits the market rules of the capacity remuneration mechanism for approval to the Regulator…

The market rules of the Capacity Remuneration Mechanism entail in particular:

…

3° the obligations for the availability obligations for capacity providers, and the penalties for violation of the obligations;

…"

Furthermore, §7 in this section of the law reads:

"…During the entire period of delivery of capacity, the transmission system operator will verify the availability of the contracted capacity, in accordance with the market rules of the capacity remuneration mechanism intended in paragraph 8."

This means that the law appoints to Elia the task of proposing the CRM Market Rules – to be approved by CREG – and also the execution of the availability verification during the Delivery Period. Given these responsibilities and in preparation of the first iteration of this design cycle, Elia leaves the current design note on Availability Obligations and Penalties up for consultation by the market.

The details for Availability Obligations will be mainly governed by the CRM Market Rules and further described in the Capacity Contract. Article 7undecies §8 also gives a framework for this contract:

"After the auction, the Capacity Providers will close a Capacity Contract with the Contractual Counterparty appointed according to article 7 quaterdecies. The Capacity Contract describes the obligations of the Capacity Provider, in particular the availability obligation…

…The Capacity Contract is in accordance with the market rules of the Capacity Remuneration Mechanism intended in paragraph 8. The standard Capacity Contracts are approved by the Regulator, upon proposal of the Contractual Counterparty, where appropriate drafted in cooperation with the Transmission System Operator, and published on the website of the Contractual Counterparty."

AVAILABILITY OBLIGATIONS AND PENALTIES IN THE BROADER FRAMEWORK

Figure 1 illustrates this provision in the broader legal framework, where Availability Obligations and Penalties are marked by an orange box.

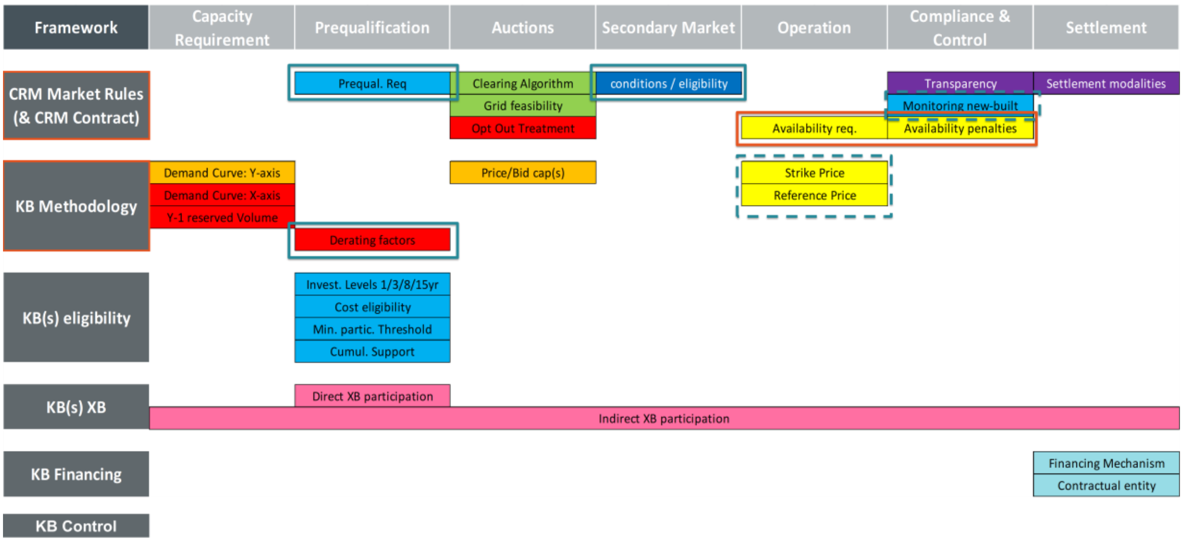

Figure 1: CRM legislative framework

This topic of the Availability Obligations and penalties interacts with other elements of the CRM design. In particular the topics Derating Factors, Secondary Market and Prequalification Requirements – indicated by the green boxes in Figure 1 – link strongly with Availability Obligations and Penalties, and will be referred to throughout the text.

It is also part of the larger view of the "Capacity Product", i.e. the functioning of a Capacity Market Unit (CMU) once it has been contracted in a CRM. Availability Obligations and Penalties need to play a specific role and function in the Capacity Product that fits together with the other elements that compose the CRM design.

Section 2 defines this role as guaranteeing adequacy during the Delivery Period, particularly in the interaction between Availability Obligations and Penalties, Monitoring new-built (henceforth referred to as "Pre-Delivery Period Monitoring") and Strike and Reference Price (indicated by the green dotted boxes in Figure 1). The design of the latter two are however out of scope for this design note and are treated in separate notes ("Strike & Reference Price" & "Monitoring").

Section 2 defines objectives the Capacity Product should respect, which are in line with the objectives of the Capacity Remuneration Mechanism and the Market Rules as defined in the Belgian Electricity Law[1]. It will conclude on two things:

1. Adequacy, cost-efficiency and no market interference are the prime objectives for the Capacity Product.
2. The Availability Obligations explained in this note as the prime driver of adequacy during the Delivery Period, contrary to the pay-back obligation (capturing windfall profits during the Delivery Period) and Pre-Delivery Period Monitoring (applying before the Delivery Period).

DESIGN OF AVAILABILITY OBLIGATIONS AND PENALTIES

Knowing that the main function of the Availability Obligations and Penalties is guaranteeing adequacy during the Delivery Period, the design is constructed to achieve this objective.

Section 3 develops the Availability Obligations mechanism further. It selects a trigger-based mechanism using the Day-Ahead Market Price as a reference and most appropriate to achieve the Capacity Product objectives. This leads to the definition of AMT Hours and AMT Moments that can be monitored. It will then define a method for all participating CMU's to assess a difference between Obligated and Available Capacity at relevant moments for Monitoring of availability. In case the Availability Monitoring leads to insufficient proof of capacity to deliver energy when needed (i.e. Proven Availability) for certain CMU's, they are prone to Availability Tests.

An availability penalty applies to a positive difference between Obligated and Available Capacity not covered in the Secondary Market. This is referred to as "Missing Capacity" Section 4 presents the proposed method for calculating this penalty. Next to a proportional formula to this difference, it foresees modalities for the escalation of penalties.

2 Definition of the capacity product

The Capacity Product is defined as the complete set of rules and regulations that drive the behavior and performance of contracted capacity in the CRM. It thus entails the functioning of Capacity Market Units in the Capacity Remuneration Mechanism after contracting. Different forms of rules and regulations determine this:

- The Clean Energy Package
- the Belgian Electricity Law[1]
- the various Royal Decrees concerning the CRM (see Figure 1)
- the Market Rules (see Figure 1)
- The Capacity Contract

In essence, they need to provide the right signals and incentives to achieve the desired objectives from the Capacity Product. Article 7undecies of the Belgian Electricity Law[1] provides a basis for these objectives (own translation):

- § 3. *"The level of security of supply to be achieved predetermined before the CRM shall correspond with the demand curve…"*
- §1: *"…The CRM shall be designed so that the cost is as low as possible"*

This means that the overall objective of the CRM for Belgium is to ensure a level of Security of Supply at the lowest cost possible. Both "Adequacy" and "Cost-Efficiency" are therefore considered as the first two primary objectives for the Capacity Product.

A third primary objective of the Belgian CRM is "No Market Interference". This follows from the Clean Energy Package, which imposes that capacity mechanisms ensure among others:

- Technology neutrality of the mechanism
- Level playing field for all participants
- Limit the market distortions caused by a CRM

Figure 2 summarizes the three principal objectives of the capacity product.

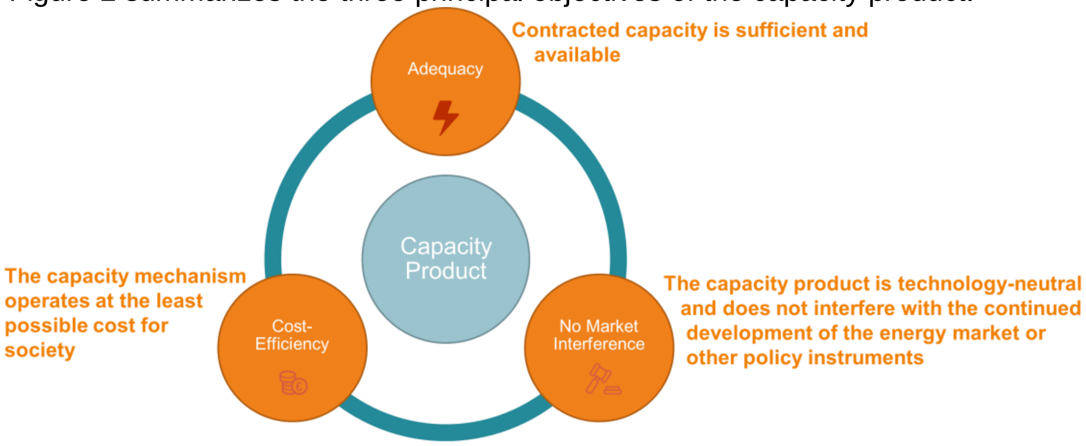

Figure 2: Principal Capacity Product objectives.

Before treating the Availability Obligations and Penalties design, it is useful to define their role in the bigger picture of the capacity product. It is important to keep in mind that they only come into play after selection of a CMU in the auction and signature of the Capacity Contract. However, the interaction with other design elements applying at that point are also of importance. Particularly, the "Pre-Delivery Period Monitoring", "Strike Price" and "Reference Price" have also their characteristics/boundaries and also serve objectives. They will thus also influence the aforementioned functioning of the Capacity Market Units. The boundaries and objectives of each of these elements thus warrant a clear definition.

In this light, the design considers Availability Obligations as the **prime driver for adequacy during the Delivery Period**, by ensuring the availability of CMU's at adequacy-relevant moments. Figure 3 gives a summary of the relationship between Availability Obligations and Penalties, Pre-Delivery Period Monitoring and the Payback Obligation.

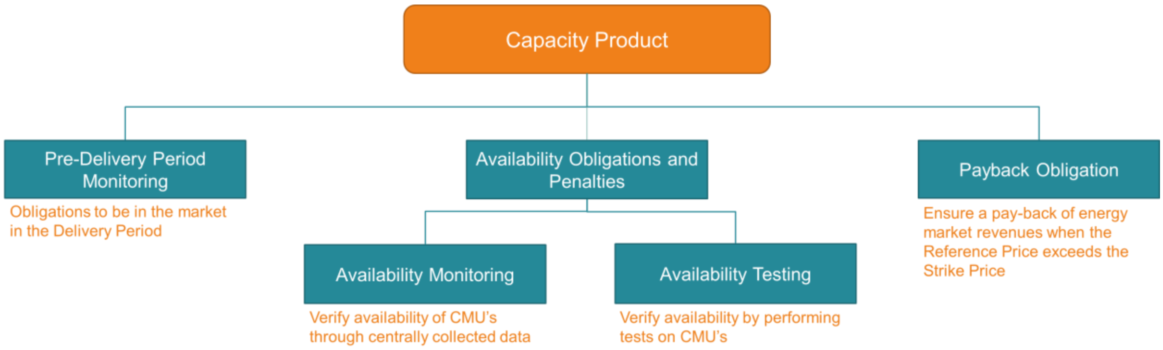

Figure 3: Summary of the different obligations of the Capacity Product

The Pre-Delivery Period Monitoring serves to ensure entry into market of the CMU's that were contracted in the Capacity Auction. It takes place in the period starting from signature of the Capacity Contract right up until the Delivery Period. From this point onwards, the Availability Obligations and Penalties will take over.

The remainder of this design note will treat the cases where a CMU has successfully entered into the market according to the process set out in the Pre-Delivery Period Monitoring. Availability Obligations and Penalties apply in the subsequent Delivery Period. The timeline in Figure 4 illustrates this.

Figure 4: Timeframe for application of Pre-Delivery Period Monitoring vs Availability Obligations

Contrary to the Pre-Delivery Period Monitoring, the payback obligation characterized by the Strike and Reference Price applies in the Delivery Period. The design note on Strike and Reference Price will contain the details of the proposed implementation of the Payback Obligation in the Belgian CRM. In general, Availability Obligations and the Payback Obligation are complementary to each other.

Availability Obligations and Penalties is split further into "Availability Monitoring" and "Availability Testing". Section 3 explains these concepts and their application.

3 Availability Obligations

Section 2 concluded that the Availability Obligations are the key for ensuring the availability of CMU's. This relates in particular to one of the main objectives of the Capacity Product: Adequacy. Every contracted CMU in the auction contributes to the achievement of the reliability standard, meaning that Elia should be able to verify the availability of each one. Given that the CMU's could number in the hundreds or thousands, monitoring of their availability through centrally collected data seems most appropriate.

These data can come from various sources and should be sufficient to reliably assess availability. Given that another main objective is Cost-Efficiency, the following principle should apply to the data sourcing:

> Use data collected through other market mechanisms as much as possible and limit the amount of additional data requirements imposed by the capacity remuneration mechanism.

DISCLAIMER: this principle will be applied as far as other constraints, such as legal considerations, accountability for the data and operational feasibility, permit its application. The used data sources presented in this note should be treated as indicative. The CRM design could still ask for specific data if any of the presented sources are no longer deemed plausible.

Several the Availability Monitoring mechanism design will be further detailed in this section. Firstly, paragraph 3.1 discusses the identification of the moments during which Elia will check availability. These moments should be relevant for adequacy.

In addition to the moments of monitoring, the mechanism needs to define the required level of availability. This will lead to the definition of **Obligated Capacity** in Paragraph 3.2.

The monitoring mechanism is necessary to establish the **Available Capacity** at every moment of monitoring, based on the centrally collected data. It is apparent from the functioning of other mechanisms that the available data will differ depending on unit size and technology. This will result in the definition of **CMU Types** determining the monitoring method, explained in Paragraph 3.3.

As a last resort, the Market Rules will foresee **Availability Testing** where the monitoring mechanism is insufficient. The objective of testing is to create equal degrees of monitoring and required proof of availability for all CMUs. Paragraph 3.4 proposes a basis for the modalities of testing.

3.1 Availability Monitoring Mechanism

As stated previously, the moments of monitoring have to be relevant for adequacy. In this respect, a CMU that is available all year except for when the system is in real need of this capacity has a limited contribution to adequacy as opposed to capacity that is unavailable for most of the year, but available every time the system requires their capacity. In order to reflect actual contribution towards adequacy, the monitoring should thus happen during adequacy-relevant moments. An objective manner to identify these moments is necessary. This will further be referred to as the **Availability Monitoring Trigger (AMT)**. Moments identified by this trigger are defined as **AMT Moments**.

Design Proposal #1:

Elia can perform Availability Monitoring subsequent to an Availability Monitoring Trigger (AMT). Elia can assess the Available Capacity on all CRM-contracted capacity during the AMT Moments identified by an AMT.

Paragraph 3.1.1 discusses the appropriate choice of trigger type for the Belgian Market. This will be a uniform trigger for all CRM-contracted capacity to be monitored on availability, in order to ensure adequacy at system level. It will conclude on a trigger based on the electricity Market Price, for it allows the best all capacities to contribute at the same adequacy relevant moments for the system.

Subsequently, Paragraph 3.1.2 proposes the day-ahead market price for the Availability Monitoring Trigger. The price level for the trigger will be referred to as the **Availability Monitoring Trigger Price, AMT Price** or **p_{AMT}**.

Finally, Paragraph 3.1.3 sets the basis for the calibration of **the AMT Price.**

3.1.1 Choice of trigger type

In a market environment like the electricity market, scarcity moments are strongly correlated with electricity **market price**, as this price is driven by the merit order of capacity offering to the system. The higher the market price, the less margin typically remains between production and demand and the more the system approaches complete exhaustion of these resources (i.e. scarcity). Stated otherwise, a market price could be a good and reliable summary of the state of the system in terms of adequacy.

A market price has the extra advantage that it is a market-wide signal, for which transparent information exists available to all market parties. It also implicitly takes into account the import capabilities, as foreign offers integrate in the same merit order via the single day-ahead market coupling mechanism. Since Belgium is effectively reliant on import and import capabilities make up a significant share in meeting the peak load, this effect is especially impacting.

Design Proposal #2:

The Availability Monitoring Trigger shall be based on electricity market price.

A summary of the functioning of the Availability Monitoring Trigger is given in Figure 5.

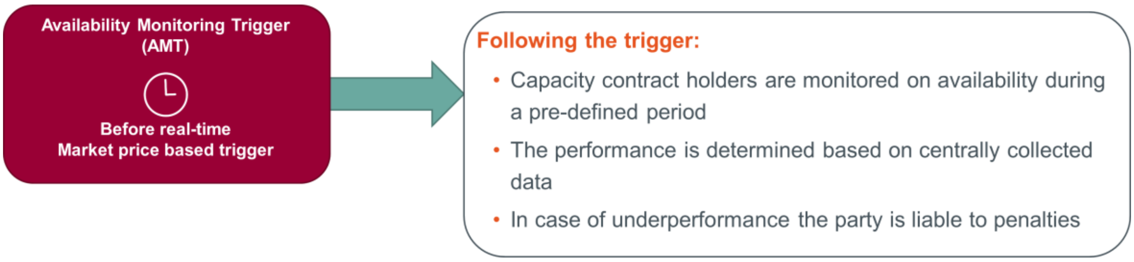

Figure 5: Illustration of the Availability Monitoring Trigger

The following paragraph will determine the appropriate market price trigger.

3.1.2 Choice of Market Price Trigger

The Market Price should be a continuous and visible price signal for the Belgian market, so that there is one reference for all involved actors (Capacity Providers, Elia, Contractual Counterparty,…). More importantly, a high price value in this reference should be relevant for adequacy. In particular it should reflect structural adequacy problems, as these are envisaged to be covered by the CRM.

To this end, the **Belgian Day-Ahead price** fits all criteria:

- Its transparency is attested by e.g. the numerous contract applications where it is used as a reference for transaction settlements.
- It is relevant for structural adequacy, since at the moment of DAM closure, BRP portfolio's need to be settled. Sufficient capacity in the market should be able to settle the portfolio's in day-ahead. Uncertainties after this point are managed via Intraday transactions, Balancing and Ancillary Services. This is more the territory of flexibility, which is not the overall goal of the CRM.
- Its accessibility to market players is attested by its liquidity compared to other markets with transparent information (25-30% of the total load in Belgium).
- In addition, the interval between selling and delivery allows for participation of technologies with slow ramping and start-up constraints. Considering structural adequacy, these types of technologies definitely contributing as well. The CRM design should also accommodate these technologies, which could include slower starting generation units, but also industrial processes that could deliver demand response when timely informed.

Contrary to the Day-Ahead price, the Intra-Day price signal has been showing less liquidity so far and by its nature is not a reference for technologies reacting slower to its timeframe. The latter is even more applicable for the real-time balancing price, which requires close-to-real-time reaction. Furthermore, many price spikes in the balancing price are due to flexibility (sometimes temporary) issues and not adequacy. The Adequacy and Flexibility study[2] published by Elia contains more information on how the two subjects are considered separately.

By using the Day-Ahead price as a reference, the design obtains a transparent, accessible and technology-inclusive signal for adequacy-relevant moments. To clarify: this does not limit the choice of Capacity Holders to participate in any of the other existing markets. It only serves to indicate that the capacity should be available in any market at occurrences of a high Day-Ahead market price. Section 3.3 contains more information on how this applies.

Day-ahead trades are made through NEMO's, via their dedicated platform. Decoupling of the NEMO from the market could lead to the unavailability of a correct Day-Ahead price. In this case, the AMT trigger should not apply.

Design Proposal #4:

When a NEMO composing (part of) the reference Day-Ahead price is decoupled from the Day-Ahead Market (e.g. due to IT problems), this must not lead to the triggering of an AMT.

A sufficient, yet simple and transparent rule for triggering Availability Monitoring would be if the **Day-Ahead price exceeds a certain level**. Since price levels depend largely on the capacity in the market – which can vary from one Delivery Period to another – a **yearly calibration** of this level seems appropriate. This calibration will be subject to the method described in the Market Rules and further clarified in the next paragraph.

The price level causing the AMT will be the system-wide indicator, applicable to all contracted CMU's. This price level will be further referred to as the **AMT Price** or $\mathbf{p_{AMT}}$.

As a consequence of choosing the Day-Ahead price as a trigger, the Availability Monitoring applies on an hourly basis. Every hour causing an AMT – i.e. for which the Day-Ahead price exceeds the AMT Price – is referred to as an **AMT Hour**. A string of consecutive AMT Hours make up an **AMT Moment**.

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[2] http://www.elia.be/~/media/files/Elia/publications-2/studies/20190628_ELIA_Adequacy_and_flexibility_study_EN.pdf

Design Proposal #5:

An Availability Monitoring Trigger occurs when the Day-Ahead Market Price exceeds the AMT Price.

The AMT Price will be calibrated yearly and defined in the Market Rules

Every hour where the Availability Monitoring Trigger occurs is an AMT Hour. A string of consecutive AMT Hours makes up an AMT Moment.

At any AMT moment, Elia can assess the availability for each AMT Hour composing the AMT Moment.

Figure 6 illustrates this with two example cases, both with an AMT Price of 150 €/MWh. In Case 1 the Day-Ahead price supercedes 150 €/MWh during the block of hours 2 through 5, i.e. consecutively above 150 €/MWh. This interval consists of one single AMT Moment. Each of the consecutive hours 2-3-4-5 are AMT Hours. Hours 1 and 6 are not AMT Hours and are thus not considered for Availability Monitoring, as the price is below 150 €/MWh.

In Case 2 there are two AMT Moments as there are two separate strings with AMT hour(s): hours 2-3 (2 AMT Hours) and hour 5 (1 AMT Hour). Elia will not apply monitoring during hours 1, 4 and 6 in this case.

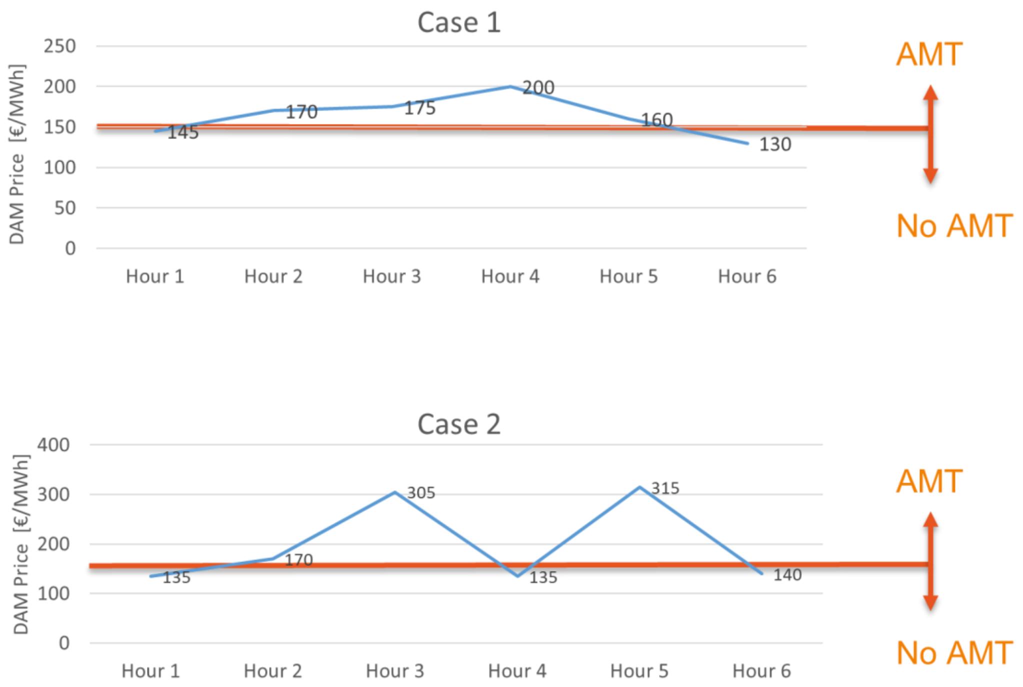

Figure 6: Example cases of AMT Hours and Moments for p_{AMT} = 150 €/MWh

The next Paragraph discusses the method for calibration of the AMT Price.

3.1.3 Calibration of the Availability Monitoring Trigger Price

This paragraph aims to describe a method for a yearly calibration of the AMT Price, i.e. a single Day-Ahead electricity price level above which Availability Monitoring will take place. The objective is threefold:

- The trigger should correspond to adequacy-relevant moments
- The trigger should occur sufficiently during the Delivery Period to have clear incentive to be available
- The trigger should be transparent during the Delivery Period

The current design proposal aims to achieve these objectives by taking the steps shown in Figure 7:

Figure 7: steps in the yearly calibration of the AMT Price

Each step is now explained in more detail.

Step 1: **establishing price-duration curves for the considered Delivery Period**

Determining statistically likely, but adequacy relevant price levels requires price occurrences for the Delivery Period. This is best shown in monotonic price-duration curves (see Figure 8). The moment for establishing these curves and nature of the curves are key to a qualitative calibration. Both will be discussed separately. The moments most relevant to adequacy are at high end of the curve when the highest prices occur.

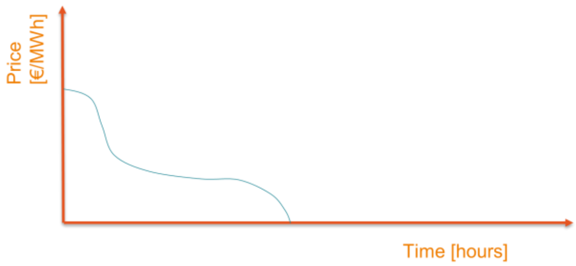

Figure 8: Illustration of a price-duration curve

Moment of calibration:

In order to retain a transparent AMT during any Delivery Period, it is best to determine the value of AMT Price upfront. The absence of an ex-ante transparent signal would result in increased uncertainty for Capacity Providers and – as a result – also increased cost of CRM (which is contrary to the cost-efficiency objective). Additionally, any financial incentives for corrective behavior stemming from the Contractual Counterparty (e.g.: availability penalties) would come long after the occurrence of the AMT Moments. This results in slow market feedback, to the detriment of the adequacy objective. This then excludes determining the AMT Price based on a price duration curve using the real DAM price values observed during the Delivery Period itself, as they are only known ex-post.

It is therefore proposed that the calibration should be based on the information used in the preparation of the Y-1 auction and also take into account the results of the Y-1 (and earlier Y-4) auction for the relevant Delivery Period. This yields the most recent view on capacity resources for a Delivery Period. This is in the advantage of both sufficient monitoring hours and risk perception from market actors due to possible variation of the real AMT hours. In addition, there is no strong need for market parties to know the value of the AMT Price before the Capacity Auction in Y-4 as long as they can have a view on the expected amount of AMT hours. A calibration close to the Delivery Period is desirable. Figure 9 shows a simple timeline.

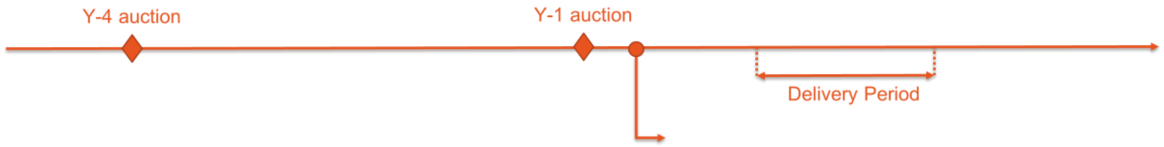

Figure 9: illustration of timeline for calibration

Nature of the price duration curves used for calibration of the AMT Price

Finally, the calibration method should assess multiple statistically relevant cases for which the price-duration curve will have different values. To this respect, the design proposes the inclusion of the following cases stemming from probabilistic calculations:

- **Expected:** a median outlook on the anticipated price-duration curve throughout the Delivery Period
- **Mild year**: anticipated price-duration curve should the underlying drivers cause relatively low prices throughout the Delivery Period (e.g.: mild winter), e.g. via a P_{10} curve
- **Worst case**: anticipated price duration curve should the underlying drivers cause significantly higher prices throughout the Delivery Period (e.g.: harsh winter/high unavailability), e.g. via a P_{90} curve

This allows to take into account exceptional cases driven by climate factors and unavailability of capacity. Figure 10 shows an example of all price-duration curves.

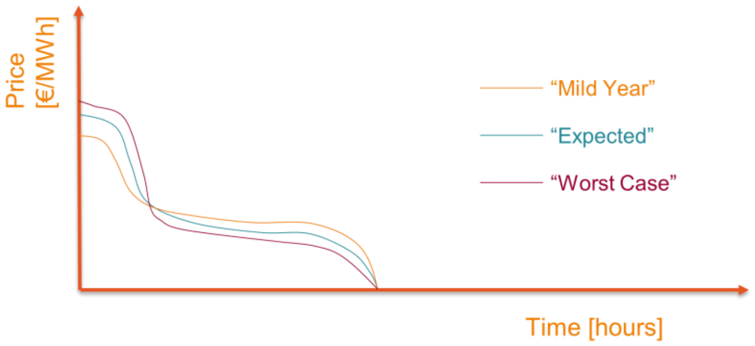

Figure 10: Illustration of different Price-Duration curves to be determined

To achieve these estimations, Elia proposes to use price-duration values resulting from probabilistic market modeling used for the calibration of other CRM parameters (e.g. derating, intermediate price cap,…). In doing so, the estimation is sure to be in line with other considerations. The resulting price-duration curve can now be used for calibration in step two.

Step 2: identifying the "Expected" price level

This price level should correspond to statistically likely, adequacy relevant (i.e. above normal values of the market price) occurrences. A subset of the highest prices estimated by the "Expected" price-duration curve established in Step 1 should include these occurrences. The lowest price observed in this subset is then equal to the AMT Price. Figure 11 shows an example of determining the AMT Price based on an estimated price-duration curve.

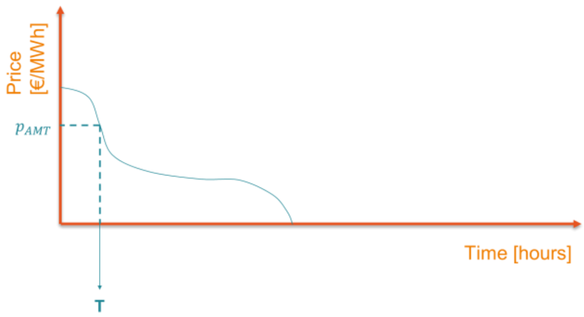

Figure 11: Example of calibrating p_{AMT} using a price-duration curve for the Delivery Period

The choice then comes down to determining a number of hours *T* comprising the likely and adequacy relevant occurrences. This balanced value for *T* is beneficial as too much of a bias in one direction could undermine the initial objectives:

- **Downwards:** too little AMT hours could result in too little credible threat for market parties to make themselves available. This is to the detriment of the adequacy objective.
- **Upwards:** this could lead to excessive availability demand (especially regarding planned maintenance). This is to the detriment of the cost-effectiveness objective.

This period should be specified in the Market Rules for the capacity market mechanism and will be a relatively stable parameter from year to year.

Elia proposes a value of ***T = 100 hours***. Such amount allows for a sufficient set of hours to verify the actual availability, it also allows to ensure availability during a reasonable level of hours. If for instance on a tight day a morning peak would last 2 hours and an evening peak 3 hours, this would correspond to about 20 days during which during peak hours availability could be monitored. Obviously, by relying on a price signal (i.e. the preferred choice for the AMT) a much finer assessment of actual adequacy relevancy can be obtained compared to a very simple morning/evening peak approach.

Table 1 gives the historical 100 hour price level for 2015-2018 of the BELPEX/EPEX Day-Ahead spot prices, showing that this level can differ considerably from year to year.

Table 1: Historical BELPEX/EPEX Day-Ahead price levels surpassed during 100 hours

Year	Day-Ahead price level only surpassed during 100 hours
2015	82,53 €/MWh
2016	104,94 €/MWh
2017	121,3 €/MWh
2018	120.1 €/MWh

Figure 12 shows the price-duration curves for the same years. It shows that below 100 hours of duration, the variation in prices becomes significantly higher, whereas for longer durations the curve shows little variation (i.e. a more flat part of the curve). This illustrates that – historically – 100 hours indeed reflects exceptional events.

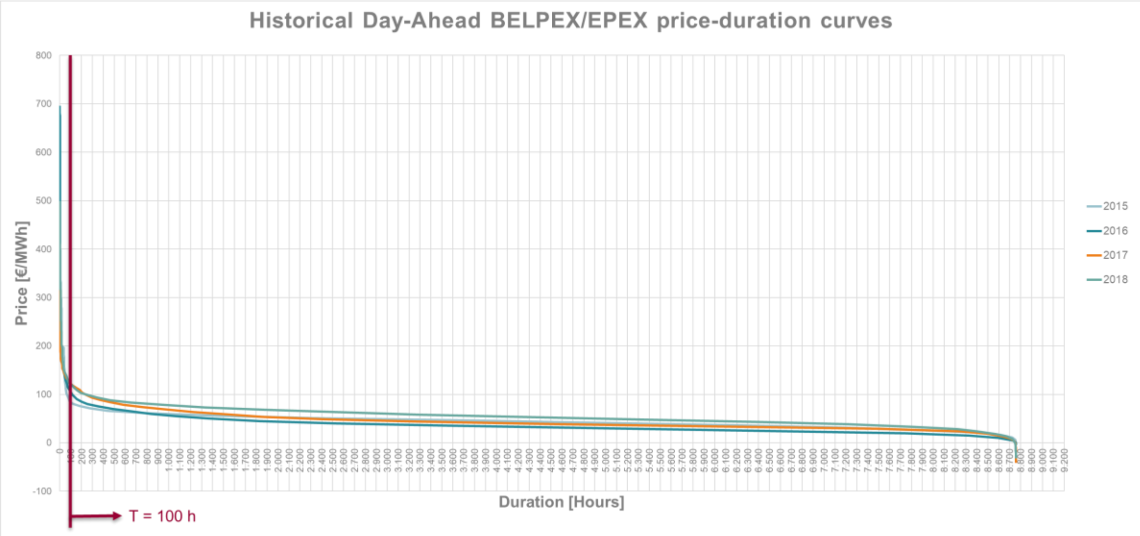

Figure 12: Historical BELPEX/EPEX price-duration curves

When looking at the Expected price duration curve for the Delivery Period, the price corresponding to T=100h is defined as the AMT Price (as Figure 11 illustrates).

Step 3: covering exceptional cases

Step 2 established a(n initial) value for the AMT Price. The methodology should now verify if this value is robust against exceptional cases when considering intra-Delivery-Year variations. This can be done by comparing the "Expected" price duration curve with those for the "Mild year" and "Worst case". The following two elements are proposed:

1. **Mild year:** identify if the duration corresponding to p_{AMT} is larger than a pre-defined value "**T-**". If not, p_{AMT} becomes the price corresponding to T- in the Mild year price-duration curve. The value of T- will be fixed in the Market Rules. Elia proposes a value of **20 hours** for T-.
2. **Worst case:** the maximum amount of AMT hours that could be monitored during a delivery are capped at the duration corresponding to p_{AMT}. This cap is defined as "**T+**".

Figure 13 illustrates the ensemble of calibrating p_{AMT} and T+, using T and T-. This is the last step in calibration the AMT price before publication.

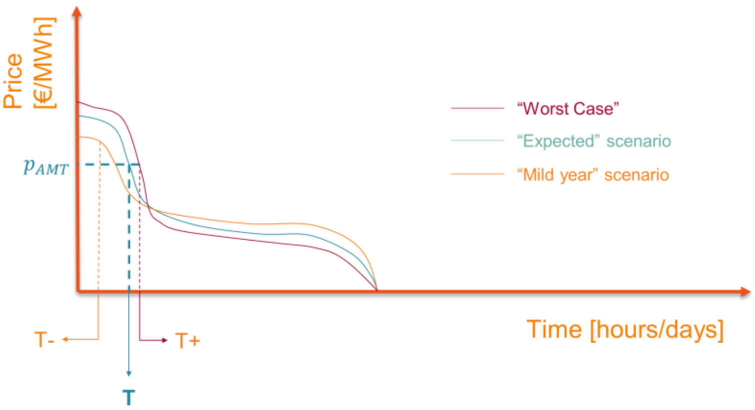

Figure 13: Conceptual illustration for callibrating p_{AMT} and T+ using T and T-

Step 4: publication

Publication of the AMT Price will be after the Y-1 auction. This is a direct consequence of the calibration timing discussed in step 1 of the process. Additionally, it ensures level playing field Y-4 and Y-1 auction, as neither have AMT Price information before bidding in the Capacity Auction. The candidates for the Y-1 auction should not need this information either, for the same reasons as Y-4 candidates (explained in Step 1). Figure 14 a simple timeline.

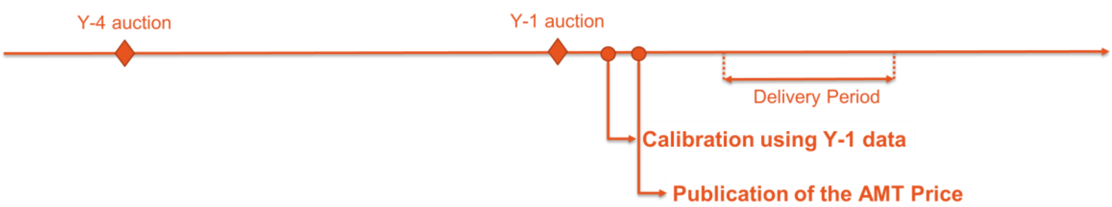

Figure 14: timing of publication of the AMT Price

The Design Proposal below lists the full process.

Design Proposal #6:

The AMT price will be ex-ante determined in the year preceding the Delivery Period, based on “Expected”, “Mild year” and “Worst case” cases. The cases shall be based on a scenario consistent with the one(s) determined to calibrate the volume to be procured through the CRM as defined in the Royal Decree methodology meant in Art. 7undecies §2 of the Electricity Law.

The first value of the AMT Price shall be the price corresponding to a duration of “T” hours in the “Expected” scenario price-duration curve. The Market Rules will specify the period “T”, currently proposed at 100 hours.

It shall be verified if this value for the AMT price results in a predicted duration that is larger than a pre-defined minimal duration “T-“ in the “Mild Year” scenario. If this is not the case, AMT Price should instead be set to the price value corresponding to a duration of “T-“ in the price-duration curve of the “Mild Year” scenario. The Capacity Market Rules will define the value for “T-“, currently proposed at 100 hours.

A cap will apply on the effective number of monitoring hours during the Delivery Period. Even if there are more AMT hours during the Delivery Period, Availability Monitoring for those hours will no longer be penalized. It is determined as the duration predicted for the AMT price in the predicted price-duration curve for the “Worst case” scenario. This value is denoted as “T+”.

Publication of the AMT Price value and T+ occurs after the closure of the Y-1 auction. Once published these parameters are fixed for the concerning Delivery Period.

This finalizes how to establish the single trigger that will result in the monitoring of capacity availability contracted in the CRM framework. The next step is to define which amount of capacity is required at AMT moments for all types of contracted capacity. This definition needs to be consistent with the way it is taken into account in adequacy modeling, considering the technical aspects of different capacity types, and it should be non-discriminatory.

3.2 Obligated Capacity

The goal of this paragraph is to define the capacity required at AMT moments from each CMU. Therefore, it will define the rules to establish the “Obligated Capacity” or “$P_{obligated}$” for each CMU and each AMT Hour. The CMU has to make the Obligated Capacity available at every AMT Hour separately in order to ensure adequacy. Paragraph 3.2.1 explains the motivation and application of this principle further.

Generic rules to define the Obligated Capacity apply to all CMUs. In order to ensure the contracted adequacy, the obligation needs to be consistent with how the adequacy model takes the CMUs into account, i.e.: how the derating is determined (more information on this in the Derating Factors design note). For this, there is a difference between non-energy constrained and energy constrained CMU’s, further explained in paragraphs 3.2.2 and 3.2.3 respectively.

The Monitoring Mechanism will then compare this with the measured Available Capacity to assess any volume that is liable to an Availability Penalty in paragraphs 3.3 and section 4.

3.2.1 Ensuring hour-by-hour adequacy

A system is adequate when the capacity in the system is able to cover the load at any time in line with the reliability standard. This is why the Capacity Auction procures a derated volume covering peak demand up until a reliability standard. Therefore, to be adequate, the market should be able to rely on this volume of capacity at all adequacy-relevant moments.

The Availability Monitoring mechanism serves as a verification that the procured capacity could indeed respond to a market signal in day-ahead, in order to meet the demand. This means that every CMU should make at least their Eligible Volume (see 3.2.2) or the Reference Power according to their SLA (see 3.2.3) available to the market. Moreover, they should do so at every AMT hour, as insufficient capacity at one AMT hour could cause an adequacy issue. Figure 15 illustrates this principle. The volume required to be available for a specific AMT Hour is referred to as the Obligated Capacity.

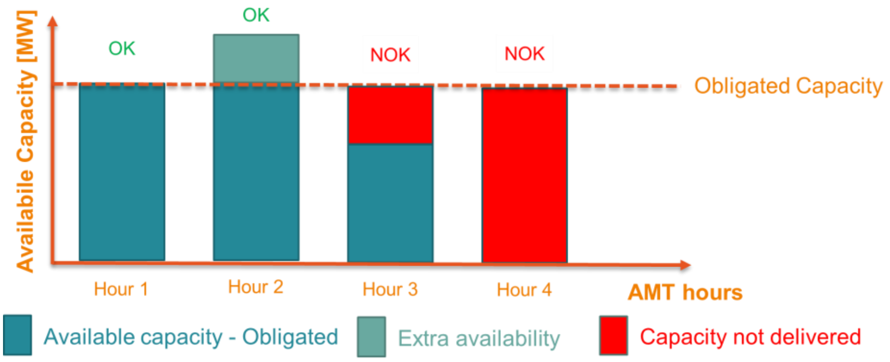

Figure 15: Conceptual illustration of Obligated Capacity for each AMT hour (i.e. for non-energy-constrained CMU's

It is important to note that the AMT Hours are the moments for which the capacity was contracted in the first place. Any unavailability during these hours detracts from the contracted service. For this reason, Availability Monitoring will apply regardless of Forced or Planned Outages. The obligation will also not be Load-Following, since the check is on availability of capacity, not delivery of energy.

Paragraph 3.3 defines the rules for measuring Available Capacity in the Availability Monitoring Mechanism. In case of Missing Capacity – i.e. a positive difference between Obligated and Available Capacity not covered in the Secondary Market – a penalty could apply, as section 4 describes. To avoid such a penalty, the CMU could instead source the missing capacity on the Secondary Market of the CRM. Oppositely, “Hour 2” in Figure 15 illustrates that a CMU could also be available beyond their Obligated Capacity during AMT Hours. In this case, the excess capacity can be sold on the Secondary Market. More information on these types of exchanges can be found in the Secondary Market design note.

At a system level, this creates an incentive to maximize available capacity during AMT Hours. Therefore, this design principle incentivizes system adequacy at all AMT hours.

Design Proposal #7:

CMU’s have to provide their Obligated Capacity at every AMT hour. The Obligated Capacity is not influenced by Forced or Planned Outages.

3.2.2 Obligated Capacity for non-energy constrained CMUs

For these CMU types, the duration of the AMT moment (i.e. the number of AMT hours) does not cause unavailability. This is why a uniform Obligated Capacity for every AMT hour should not affect the expected expenses and revenues.

The derating of non-energy constrained CMU’s is based on statistical drivers, such as forced outage rates and – for e.g. renewable sources – climate conditions. The adequacy model counts on these units to deliver make at least the Eligible Volume available.

Design Proposal #8:

For non-energy constrained CMUs, the Obligated Capacity is at every AMT hour equal to the Eligible Volume as established in the Prequalification phase preceding the Capacity Auction.

In practice, these units will be available at full capacity at some AMT moments and significantly less or not at all at others. Using the principles of Secondary Market trading as explained above, the CMU’s should be able to deliver at least the Eligible Volume on average.

3.2.3 Obligated Capacity for energy constrained CMU's

If a CMU is energy constrained (e.g. a battery or an industrial process which can only be stopped for a limited time), it knows beforehand that at AMT Moments lasting longer than its energy constraint, it will have expenses on covering the Missing Capacity (i.e. penalty or replacement capacity). This is not compensated by benefits of availability in the other AMT Moments, exactly because they will be shorter. A CMU like this would then incorporate the expected expenses for a uniform Obligated Capacity at all AMT Moments in the CRM bid, inflating the overall cost. This is contrary to the cost-efficiency objective.

Additionally, the adequacy model does not impose such a uniform profile for energy constrained CMU's. It determines their contribution **according to their Service Level (SLA)** comprising the energy constraint. This leads to a categorization of derating Table 2 shows.

Table 2: SLA's for Energy Constrained CMU's as defined in the derating design

"Aggregation category"	Duration	Limits
SLA #1	1h	1 activation / day
SLA #2	2h	
SLA #3	3h	
SLA #4	4h	
SLA #5	8h	
SLA #6	No Limit	

In order to be adequate, it is sufficient that these CMU types make their capacity available, as long as their energy is not depleted. However, at such moments, the system requires the Reference Power, not the Eligible one. Figure 16 illustrates this principle for a 50 MW Reference Power limited to two hours delivery.

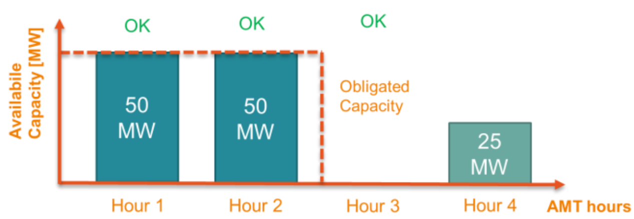

Figure 16 Numerical Example of Energy Constrained Obligated Capacity

If the Capacity Provider offers an SLA that matches the physical limit of the assets behind the CMU, they should not be able to offer any capacity to the Secondary Market.

However, if a CMU does deliver beyond its SLA (e.g. Hour 4 in Figure 16), it is in excess to what was contracted for the CRM and can be offered (ex post) to the Secondary Market.

This is especially advantageous when Capacity Providers see reasons beyond the Energy Constraint to be unavailable. Because these types of products are typically very diverse (e.g. demand response, aggregates…), an individual assessment by the capacity provider of the capacity before SLA derating is advantageous to be able to strike the higher-mentioned balance between costs (i.e. penalties) of not respecting the SLA-determined availability and revenues (from both Primary and Secondary Market). This is why the design allows a Capacity Provider to declare – to an extent – their own Reference Power during Prequalification (see dedicated design note for rules).

Design Proposal #9:

For energy constrained CMU's, the Obligated Capacity is equal to the Reference Power, as determined during the Prequalification phase, for all AMT hours in one day until energy constraint of the SLA has been met by energy delivery of the assets comprising the CMU. After that, the Obligated Capacity will be equal to 0 MW for any other AMT Hour occurring in the same day.

3.3 Available Capacity and CMU Types in the Capacity Market

The Availability Monitoring mechanism has to define how the Available Capacity can be assessed at each AMT Hour and for every category of CMU. Paragraph 3.3.1 specifies the rules for this, respecting the previously determined cost-efficiency principle that it should use data channels from existing market mechanisms as much as possible. The disclaimer at the beginning of this chapter still applies to this principle.

In this segmentation, some categories of CMU's will only truly deliver at prices that could exceed the AMT Price. To take this into account the Declared Market Price (DMP) is introduced. This means that the proof of this Available Capacity's capability to deliver the corresponding energy will be limited to certain price occurrences. This is where Proven Availability becomes relevant. Paragraph 3.3.2 elaborates on both principles.

Finally, CMU's contracted in Ancillary Services by Elia are considered available for the contracted period unless proven otherwise via the availability checks foreseen in the context of the ancillary services. More clarifications on this link between mechanisms is explained in paragraph 3.3.3.

3.3.1 Rules for evaluating Available Capacity for each CMU Type

A first indicator of availability already in place today is the data coming through outage planning agents on the maximum available capacity of units. This is today the case for the CIPU contract typically applicable for units above 25 MW installed capacity, which are obliged to send a full schedule (including nominations of production). These obligations for these units will persist in the future.

In the future, this will be extended in the framework put forward by the System Operator Guidelines (SOGL)[3]. Therein, the obligations for the Outage Planning Agent to communicate asset availability and obligations for assets to have an assigned Outage Planning Agent are set out. Elia facilitates the implementation of this framework on a Belgian level, in close collaboration with the stakeholders[4]. The current design proposal obliges availability data on generation/storage starting from Type B (currently set as > 1MW installed capacity) as defined following the Network Code dealing with Requirements for Generators and Demand Facilities directly connected to Elia's grid.

Remark: *please take note that this framework is still under construction and – whereas the proposal in this Design Notes outlines principles based on the latest information – this could still be adapted in function of the final result, as also denoted in the disclaimer at the top of this section.*

The Availability Monitoring will take the information received through Outage Planning Agents where available. The Outage Planning Agent can communicate three availability statuses. The link between the rated "Available Capacity" in the CRM is given in Table 3.

Table 3: Relation of Availability Status vs Available Capacity

Availability Status	Available Capacity
"Available"	$P_{max,\ Available}$[5]
"Unavailable"	0 MW
"Testing"	0 MW

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.220.01.0001.01.ENG&toc=OJ:L:2017:220:TOC
[4] As part of a larger project commonly referred to as ICAROS (Integrated Coordination of Assets for Redispatching and Operational Security)
[5] Any communicated restrictions on the production capacity, as determined in the SOGL, will be taken into account

CMU’s not having any outage planning obligations, should communicate planned unavailability until D-1 before the Day-Ahead market. This is similar to assets with outage planning obligations under the SOGL and falling under the “Alternative Outage Coordination Calendar” in the current proposal put forward by Elia. Any future evolutions of these rules could apply on the CRM as well.

Design Proposal #10:

Available Capacity is primarily determined on the data received via the Outage Planning Agent, according to Table 3. CMU’s without outage communication obligations should notify Elia of any planned capacity restrictions before D-1 before Day-Ahead at the latest.

Specifically for Demand Side Response products and aggregations, the capacity to reduce consumption is important. This is why Available Capacity at any AMT Hour for a demand product (prior communicated outages as mentioned above notwithstanding) will be a comparison of the consumption with an Unshedable Margin (UM), established during the Prequalification Phase. This does not give the CMU an incentive to consume, as the modalities defined in 3.3.2 allow them to indicate when they will reduce consumption (i.e. dispatch themselves based on market signals).

Design Proposal #11:

Available Capacity at any AMT Hour for demand side response and aggregation will be a comparison of the measured consumption with an Unsheddable Margin (UM), established during the Prequalification Phase.

Additionally to a declaration of availability, the capability of delivering energy when required by the market needs to be demonstrated. For units with a full scheduling obligation (i.e. CIPU units today, as defined by the Belgian adaptation of the SOGL in the future) the consistency with the nominated P_{max} is apparent from the usage of that margin today in e.g. the balancing mechanism.

Design Proposal #12:

The availability of CMU’s with a full schedule including P_{max} nominations will have an Available Capacity at each AMT Hour of P_{max} nominated, notwithstanding capacity reserved in Ancillary Services.

On the other hand, energy of smaller-scale generation/storage – without full schedule – and demand management assets is much less visible via the typical market mechanisms. Whereas the CRM should not impose the delivery of energy, it should ask for proof of delivery when market conditions are favorable for the market actor. This should be a question of sufficiently high market price. Therefore, the Availability Monitoring takes the Outage Planning Data (and consumption for DSR) as a reference except for AMT Hours where the Day-Ahead electricity price surpasses a level declared by the Capacity Provider as favorable. This Day-Ahead price level will further be referred to as the **“Declared Market Price”** or the **“DMP”**. Paragraph 3.3.2 explains the modalities for communicating such DMP.

At these AMT hours, the CMU is expected to deliver energy at its Reference Power. The Monitoring Mechanism will verify if the output of the unit indeed matches the Obligated Capacity for those hours (see 3.2). For generation or storage with direct metering this is simply the output at the meter, or “$P_{measured}$”. For DSR or delivery at a delivery point with net offtake, this is a comparison of the measured consumption (“$P_{measured}$”) with a baseline.

A priori, the baselining method will be consistent with the rules under development in the Transfer of Energy framework thereby ensuring compatibility of CRM arrangements with the energy market functioning (subject to the disclaimer in the beginning of this section).

The establishing of a metered output requires metering in the first place. The Availability Monitoring Mechanism will require quarter-hourly measurements at the Delivery Point(s) for the contracted service. An hourly value is subsequently determined – to create an equivalent granularity as the Day-Ahead reference market – as the average metered output.

Design Proposal #13:

CMU’s without a full schedule and obligations on production margin are required to prove their capability of delivering the Obligated Capacity when market conditions are such that they would deliver energy into the market. To this end, they are obligated to communicate a Day-Ahead price above which their full capacity will be used, i.e. delivering energy. This is the CMU’s DMP. The DMP must be communicated before Day-Ahead market closure. For AMT hours where the Day-Ahead price is higher than the DMP, the Available Capacity will be equal to the measured output.

Figure 17 shows a numerical example for an AMT Price of 150 €/MWh and a CMU with the following characteristics:

- 2 hours energy constraint
- Reference Power = 10 MW
- DMP = 200 €/MWh

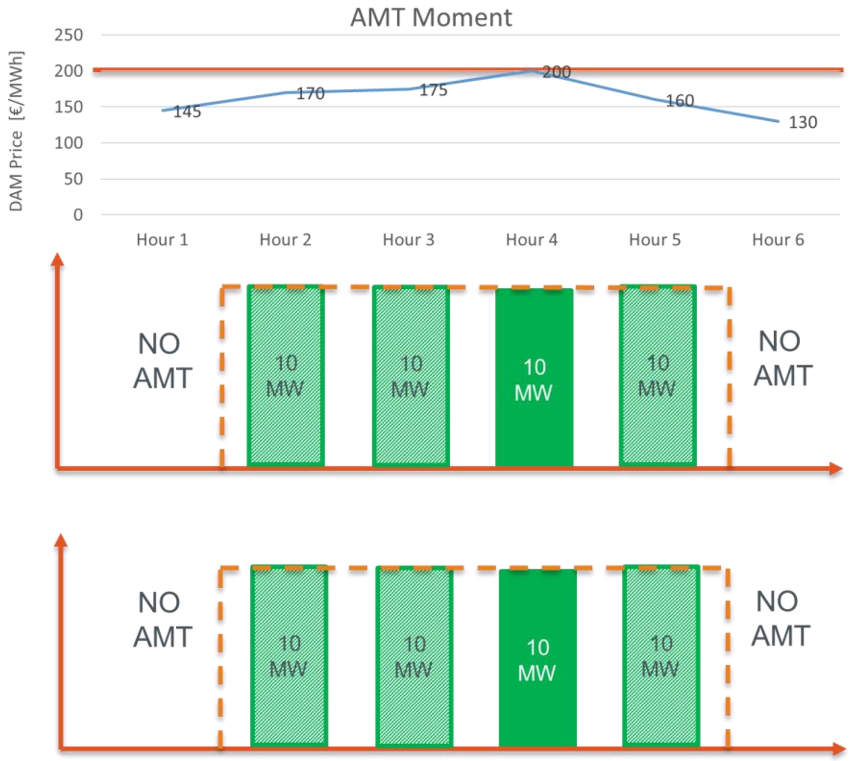

Figure 17: Numerical example for the DMP mechanism

The example CMU will have to be available for all AMT Hours (hours 2-5). It has however indicated that it will not deliver energy until the price surpasses 200 €/MWh. During hours 2 and 3 it will be considered available without delivering energy. During hour 4, however, the price is sufficiently high and a dispatched power of 10 MW should be observed. At hour 5, the price drops below the DMP again. The unit will no longer deliver energy, but is still considered available without delivering energy as the energy constraint has not yet been met.

Paragraph 3.3.2 ties this way of measuring Available Capacity to Proven Availability. Lastly, Capacity reserved in Ancillary Services is considered available. Paragraph 3.3.3 elaborates the modalities for indicating capacity as reserved in ancillary services. Table 4 summarizes the rules for establishing Available Capacity as described above.

Table 4: overview of determination of Available Capacity for all CMU Types

CMU Type	Not Reserved in AS		Reserved in AS
	Above DMP	Below DMP	
Generation/storage with full schedule	$P_{available} = P_{max,Nominated}$		$P_{Available} = P_{Reserved,AS}$
Generation/Storage without full schedule	$P_{available} = P_{Measured}$	See Table 3	
Aggregation/DSR	$P_{available} = P_{baseline} - P_{Measured}$	$P_{available} = P_{measured} - UM$ OR See Table 3	

3.3.2 Declared Market Price and Proven Availability

CMU's could have a singular Day-Ahead electricity market price for which they are willing to deliver their energy, which is constant over the entire year. For such CMU's, a singular fixed DMP is easiest. On the other hand, this price could vary due to e.g. seasonal fuel cost, opportunity costs… calling for a more dynamic DMP.

Given that both products have their merit and it is in the interest of performing correct monitoring to have the most representative information, both options should be allowed. In any case, the DMP should be disclosed before closure of the DA market to avoid gaming (e.g. no later than D-1 at 11h30).

Design Proposal #14:

For each CMU obligated to communicate a DMP, the Capacity Provider must fix a singular value for the DMP in their contract. The Capacity Provider can update the DMP by communicating a new price to Elia. This DMP cannot apply on AMT hours for which the Day-Ahead market has already closed at the time of communication. For these AMT hours, the last known value before market closure will be used.

A Day-Ahead DMP is a minimum requirement, as it is consistent with the reasoning presented in 3.1.1. When the Available Capacity during AMT hours where the DAM price surpasses a CMU's DMP is consistent with the Obligated Capacity for those AMT hours, the CMU exhibits "Proven Availability".

The distinction between "Proven" and "Unproven Availability" can be applied to the example in Figure 17 : the CMU is considered "Proven Available" during hour 4 (solid fill) and "Unproven Available" during hours 2, 3 and 5 (pattern fill).

CMU’s with the least “Proven Availability” are most likely to be tested, as explained in 3.4. This ensures that a Capacity Provider has the incentive to correctly declare DMP for a CMU:

- A DMP which is **too low** could require the CMU to react to a day-ahead price for which it would be turning a loss in the Energy Market
- A DMP which is **too high** could be so exceptional that the CMU has almost no Proven Availability and is the top priority to be tested.

In case the CMU would be able to react to Balancing price signals as well, for which the prices can be higher, it could also indicate prices for these markets. Consistent Available Capacity evaluations during AMT Hours where Balancing prices exceed declared levels also contribute to the considered “Proven Availability”. However, as the Balancing markets are not accessible to all assets contributing to adequacy, these should be considered optional. To clarify: this changes nothing to the market-wide Availability Monitoring Trigger, which is still based solely on the Day-Ahead market.

Design Proposal #15:

CMU’s can optionally communicate Balancing prices above which they would be willing to deliver the energy behind the CMU’s capacity. Elia can take this into account in the CMU’s considered Proven Available Capacity when establishing priority for testing.

Lastly, the obligated DMP should be the price for which the full Obligated Capacity is activated. For a CMU comprising of multiple assets (e.g. aggregates), each with different costs, the true price and volume could be stepped. In addition to the obligated DMP, the CMU should be able to submit multiple volume-price pairs in increasing order. Figure 18 shows an example of this stepped response to a Day-Ahead price.

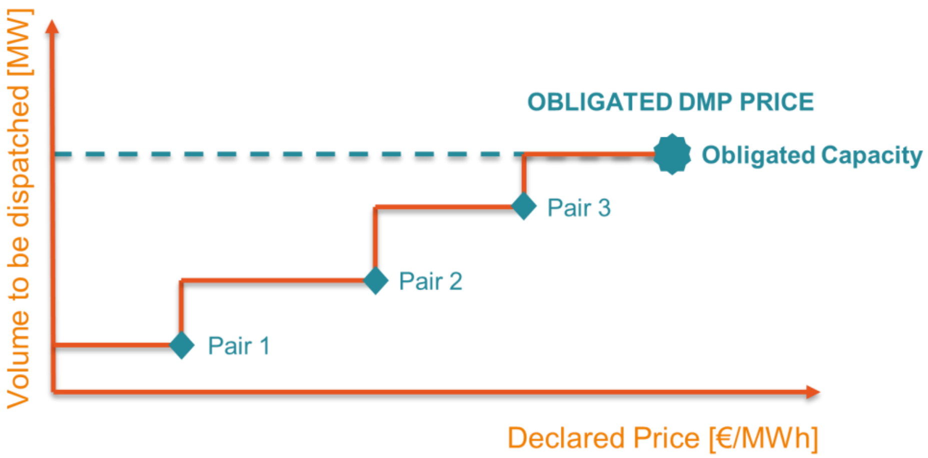

Figure 18: Illustration of multiple price-volume pairs for DMP

Design Proposal #16:

Capacity Provider can optionally communicate multiple additional DAM/Balancing price-dispatched volume pairs for a CMU, according to their real dispatching strategy which Elia will take into account when establishing Available Capacity and Proven Available Capacity.

3.3.3 Availability for units reserved in Ancillary Services

Capacity reserved in the Ancillary Services is considered available in the context for the CRM for the period during which it is contracted as Ancillary Service, unless the availability checks in the Ancillary Services reveal otherwise.

For the Ancillary Services bidding, Elia receives from the Balancing Service Provider (BSP) an offered volume and the Delivery Points at which that volume will be provided. It is not specified at the bidding stage how this volume is partitioned over the different Delivery Points. Furthermore, the bidder of the flexibility at a Delivery Point could be a different entity from the Capacity Provider. On the other hand, Elia disposes of the following information:

- **From the Capacity Provider:**
    - Delivery Point(s) for each CMU
    - Obligated Capacity per CMU
- **From the Balancing Service Provider:**
    - Ex post activated volume per Delivery Point

If the reserved bid consists of (a) Delivery Point(s) associated with one single CMU, the AS reserved volume will be added to its Available Capacity at every AMT Hour. In this case, Elia can directly associate the reserved volume with the CMU.

This is not the case if a Delivery Point associated to a CMU is successfully reserved in the Ancillary Services as part of a larger pool, consisting of multiple CMU's or non-CRM delivery points. Elia will then take note of the activated volume for Ancillary Services ex-post when determining Available Capacity during an AMT Hour. It will be equal to the sum over the delivery points of:

- The Available Capacity as determined in Table 4
- The activated volumes in the framework of Ancillary Services

As is the case for $P_{measured}$, the latter will be based on the average of the metered output over the AMT Hour.

This is numerically illustrated in

Table 5 for a “DSR/Aggregation” CMU with three delivery points – DP1, DP2 and DP3 – respectively with 3, 3 and 4 MW Obligated Capacity for the considered AMT Hour. It considers all possibilities concerning AS activation and height of DAM price compared to DMP.

Table 5: numerical illustration of Ancillary Services Available Capacity for a DSR/aggregation CMU

	Day-Ahead Price < DMP	Day-Ahead Price > DMP
AS activation of 2 MW in DP 3	DP 1 and 2 retain a margin of 3 MW compared to UM DP 3 retains margin of 2 MW compared to UM	DP 1 and 2 consume 3 MW lower compared to baseline DP 3 consumes 4 MW lower compared to baseline
No AS Activation in DP 3	DP 1 and 2 retain a margin of 3 MW compared to UM DP 3 retains margin of 2 MW compared to UM	DP 1 and 2 consume 3 MW lower compared to baseline DP 3 consumes 4 MW lower compared to baseline

This method is used to assess Available Capacity for any monitored AMT Hour within the AS-contracted period.

Design Proposal #17:

If a CMU is reserved in an Ancillary Services bid consisting only of (a) Delivery Point(s) associated with the CMU in the Capacity Contract, the reserved volume will be added to its Available Capacity for any AMT Hour, taking into account the AS activated volume when measuring the output, for the AS-contracted period, unless the tests applying in the Ancillary Services mechanism demonstrate a lack of capacity. A Missing Capacity will be established according to the results of such tests.

When (a) Delivery Point(s) associated with a CMU is successfully reserved in the Ancillary Services in one bid associated with Delivery Points not associated to the CMU, the volume of any Ancillary Services activation in the concerned Delivery Point(s) is added to its Available Capacity, on top of the method for determining Available Capacity for the CMU type.

Of course, the AS activation volume could be zero, in which case the full Obligated Capacity must be met with Available Capacity according to the evaluation defined in Table 4.

3.4 Rules for Availability Testing

Paragraph 3.3.2 illustrates the importance of Proven Available Capacity. Regarding cost-efficiency, it is most effective to determine Available Capacity as much as possible through the rules set out in 3.3. Nevertheless, as these generally applicable rules for monitoring could still cause limited visibility on certain CMU’s, provisions for Availability Testing as a last resort are necessary. Elia reserves the right to test any contracted CMU up to three times successfully during the winter period and once successfully during the summer.

Testing implies a delivery of energy up to the Reference Power, as defined in the Capacity Contract. This is done according to the same modalities for determining the Reference Power during Prequalification. Elia reserves the right to demand a test for the contracted SLA duration (see 3.2.3) up to one time successfully per Delivery Period. This means that delivery of the Reference Power must be maintained for the duration indicated in the SLA. Any other tests will only require a delivery of the Reference Power during one quarter-hour.

The test should be announced at Day-Ahead Market closure at the latest, because the Capacity Product is designed to respond at least to a day-ahead signal. In the absence of any other ramping/start-up requirements, a later announcement would not match the product definition. The nature of the test remains a "surprise test". The design regarding Availability Testing is presented in the design proposal below. Availability tests are at the expense of the Capacity Provider.

Design Proposal #19:

Elia reserves the right to test any contracted CMU up to three (3) times successfully during the winter period (1 November – 31 March) and one (1) time successfully outside of the winter period during the Delivery Period. Included therein, Elia reserves the right to test the duration of the registered SLA one (1) time successfully during the Delivery Period.

To initiate a test, Elia communicates a timeframe during which delivery of the full capacity is due, by closure of the Day-Ahead Market at the latest. The procedure for the test itself will be the same as the test performed during the Prequalification stage to determine the Reference Power. A failure of the test will result in a penalty as defined in section 4.1 as if the Obligated Capacity is the Reference Power and the Available Capacity is the Measured Power.

Any potential costs incurred by the Capacity Provider as a result of such a test will be borne by the Capacity Provider.

The selection of units to be tested is a result of an internal selection procedure from Elia that will not be disclosed in order not to loose on its surprise effect. It is however clear that Elia shall give priority to the following cases:

- CMU's with previously failed tests
- CMU's with limited "Proven Availability" during the Delivery Period
- CMU's exhibiting illogical behavior (i.e. potential gaming on DMP, structural short-term coverage on the Secondary Market,…)
- CMU's consistently failing to deliver (in Availability Monitoring or preceding Availability Tests)

4 Availability Penalties

Section 3 established the rules for determining Obligated and Available Capacity. Any positive difference between $P_{obligated}$ and $P_{Available}$ which is not covered in the Secondary Market is liable to a penalty. Δ in Figure 19 illustrates this volume for an AMT Hour. This is referred to as "Missing Capacity". As explained in paragraph 3.2.1, a Capacity Provider's requirement to cover their Obligated Capacity should be met at any AMT hour.

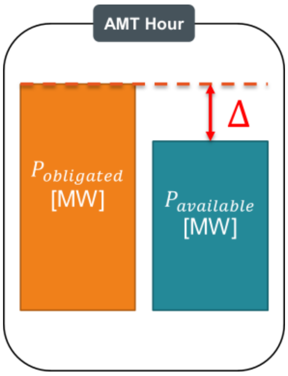

Figure 19: Volume exposed to an Availability Penalty

The penalty exists to create a sufficient incentive for CMUs to cover exposed volumes via the Secondary Market and drive system adequacy as described in Paragraph 3.2.1. A first step to achieve this would be a proportional penalty to the Missing Capacity. Paragraph 4.1 establishes a formula for such a penalty.

Consistently underperforming CMUs undermine the adequacy of the system. To discourage this kind of behavior further, an escalation procedure should be foreseen going beyond the proportional penalties. Paragraph 4.2 describes this.

Finally, the penalties applied for testing require a specific set of rules, as they are often the result of preceding limited visibility or illogical behavior. Paragraph 4.2 sets out these rules.

4.1 Proportional penalty

The Proportional Penalty should scale with two elements:

1. The positive difference between Obligated and Available Capacity
2. The value of the contract

This latter value should be divided over a certain subset of hours considered representative for the global availability performance. This period will be defined in the Market Rules and is referred to as the "Unavailability Period" or "UP". The Unavailability Period should reflect the minimum number of AMT Hours that will be effectively monitored for availabiltiy and for which – if warranted – a penalty is issued by Elia. This is consistent with the fact that the Obligated Capacity should be respected for every AMT hour. The renewed formula then becomes:

Finally, a penalty factor should apply. This factor is key in establishing sufficient incentive to be available. The formula then becomes:

$$Penalty\ [€] = \frac{(1+X) * \left(P_{obligated} - P_{available}\right)}{UP} * yearly\ contract\ value$$

With "X" as the Penalty Factor. As for the value, CMUs that have planned their unavailability and communicated this according to the specifications in paragraph 3.3.1 will be liable to a lower penalty factor (i.e. X = 0) when planned outside the winter period. Any outage planned during the winter period is likely to put adequacy more at risk, considering the adequacy drivers in Belgium. This is why only Announced Unavailability outside of the winter period receives a lower penalty factor than Unannounced Unavailability. Table 6 further specifies this feature.

Table 6: Penalty factor for Announced vs Unannounced unavailability

	Announced unavailability 01/04/20xx – 31/10/20xx	Unannounced unavailability 01/11/20xx-1 – 31/10/20xx	Announced unavailability 01/11/20xx – 31/03/20xx
X	0	1	1

Since this is a proportional penalty, the design proposes a yearly penalty cap (stop-loss limit) at the yearly contract value. Reaching the cap does not relinquish the Availability Obligation for the CMU, nor does it imply the escalation procedure discussed in paragraph 4.2. The Design Proposal below summarizes the proposal for the proportional penalty.

Design Proposal #18:

Elia can perform an availability monitoring on any AMT Hour during the Delivery Period. It should, to that end, define estimated minimal number of effectively monitored hours for the Delivery Period denoted as the “Unavailability Period” or “UP”. The value for UP should be disclosed with the market in the Capacity Market Rules.

The selection criteria for AMT Hours during which availability will be monitored will not be disclosed to the market, thereby ensuring the full incentive effect on remaining available at all AMT Hours.

UP is in no way a limitation on the number of AMT hours during which Availability can be monitored by Elia. The latter is capped at T+.

For any AMT Hour Elia can issue a penalty to a Capacity Provider for a CMU not meeting its Obligated Capacity (after taking into account exchanges via the Secondary Market) as follows:

$$Penalty\ [€] = \frac{(1+X) * \left(P_{obligated} - P_{available}\right)}{UP} * yearly\ contract\ value$$

The value of the penalty factor “X” will be 1, with the exception of Announced Unavailability outside of the winter period (1 April until 31 October), where it will be 0.

The total yearly charged amount for the proportional penalty shall not exceed the yearly contract value for the concerned CMU.

4.2 Escalation of penalties

Aside from the proportional penalty, which is the main incentive for system adequacy as in 3.2.1, extra provisions for consistently underperforming units encourages contracts that reflect true performance of the CMU. To this end, two provisions are envisaged.

Firstly, a consistently underperforming asset should be liable to have remunerated volume revised. The proposed criteria for this are the following:

Design Proposal #20:

Elia reserves the right for a downward revision of the monthly capacity remuneration of a CMU proportional to observed Missing Capacity in case of Missing Capacity (i.e. not covered by the Secondary Market) exceeding each time 20% of the Obligated Capacity at three (3) separate AMT Moments (i.e. three (3) non-consecutive AMT Hours) or three (3) failed Availability Tests. This does not diminish the Obligated Capacity demanded at each AMT Hour or Availability Test once this measure is applied.

The original remunerated amount can be reinstated if the CMU exhibits Proven Availability of at least the Obligated Capacity during three (3) AMT Moments or Availability Tests, without taking into account obligations traded on the secondary market.

The Capacity Provider has the right to request and schedule Availability Tests in order to obtain this criterion.

Secondly, severe offence regarding the Availability Obligations could lead to further contractual impact. This would be the case when a CMU incurs the first penalty escalation and fails to reinstate the original remunerated amount for two subsequent Delivery Periods. In that case, the contract will permanently be revised downwards and terminated by the start of the Delivery Period covered by the first subsequent Y-1 Auction.

Design Proposal #21:

Elia reserves the right to instate downward revision of the monthly capacity remuneration of a CMU proportional to observed Missing Capacity and terminate the contract by the start of the Delivery Period covered by the first upcoming Y-1 Capacity Auction, if during two subsequent Delivery Period the Capacity Holder as incurred for the CMU a penalty under the form of a downwards revision of monthly remuneration without reinstating the initially remunerated volume.

5 Conclusion

The whole of the presented rules and modalities presented in this design note aim to incentivize the desired behavior of any Capacity Provider for its CMUs in the CRM during the Delivery Period and in particular with the objective of maintaining system adequacy.

This behavior can be summarized on a CMU level by the following elements:

- Submitting information reflecting real expected performance in the Delivery Period
- Maximizing availability of capacity for every AMT Hour
- Covering any potential Missing Capacity in the Secondary Market
- Giving accurate and complete information during the Delivery Period for e.g. DMP, planned unavailability,…
- Deliver proof of the capability to deliver energy when it would be required in the Electricity Market

A Capacity Provider conforming itself with this behavior is expected to perform well under the design of the presented mechanism.